

Amendments to the Specification:

Please replace the title with the following amended title:

Device And Method For Binarizing An Image
Segmentation, Including Classification And Binarization Of Character Regions

Please replace the paragraph of page 1, lines 19-26, with the following amended paragraph:

Generally, a preprocessing operation is performed to recognize image characters. “Preprocessing operation” refers to an operation of processing an image before recognition of characters in the image. The image preprocessing operation can include an operation of deciding whether or not an input image is appropriate for character recognition, an operation of correcting a skew of an object in an input image, an operation of properly correcting a size of an input image, and an operation of binarizing an input image so that characters in the input image can be recognized.

Please replace the paragraph of page 3, lines 13-17, with the following amended paragraph:

It is **further** another object of the present invention to provide a device and method for classifying an image into character blocks and background blocks, grouping the classified character blocks with their neighboring blocks to enhance edge components, and separating the character blocks from the grouped blocks, before binarization.

Please replace the paragraph of page 5, lines 8-24, with the following amended paragraph:

In accordance with ~~further~~ another aspect of the present invention, there is provided a device for binarizing an image, comprising an input part for receiving an image, a block classification part for dividing the received image into blocks, and classifying the divided blocks into character blocks and background blocks, a block grouping part for grouping a character block classified by the block classification part with its neighboring blocks, thereby generating a grouped block, and an edge enhancement part for enhancing edges of the character block using relations between neighboring pixels in the grouped block, and generating a threshold for distinguishing character pixels and background pixels of the character block. The device for binarizing an image further comprises a block splitting part for separating the character block from the grouped block output from the edge enhancement part, and a binarization part for binarizing pixels of the separated character block into a first brightness value for character pixels and a second brightness value for background pixels by comparing the pixels of the separated character block with the threshold, and binarizing pixels of the background block output from the block classification part into the second brightness value.

Please replace the paragraph of page 6, lines 28-30 to page 7, lines 1-10, with the following amended paragraph:

In accordance with still another aspect of the present invention, there is provided a method for binarizing an image, comprising the steps of receiving an image, dividing the received image into blocks, and classifying the divided blocks into character blocks and background ~~blocks, blocks;~~ growing the classified character blocks, and restoring a block containing a character pixel, classified as a background block, to a character block, enhancing edges of a character block using relations between neighboring pixels in the character block, and generating a threshold for distinguishing character pixels and background pixels of the

character block, and binarizing pixels of the edge-enhanced character blocks into a first brightness value for character pixels and a second brightness value for background pixels by comparing the pixels of the character blocks with the threshold, and binarizing pixels of the background blocks into the second brightness value.

Please replace the paragraph of page 7, lines 27-30 to page 8, lines 1-11, with the following amended paragraph:

In accordance with still another aspect of the present invention, there is provided a method for binarizing an image, comprising the steps of receiving an image, dividing the received image into blocks, and classifying the divided blocks into character blocks and background blocks, blocks; growing the classified character block, and restoring a block containing a character pixel, classified as a background block, to a character block, grouping the character block with its neighboring blocks, thereby generating a grouped block, and enhancing edges of the character block using relations between pixels in the grouped block, and generating a threshold for distinguishing character pixels and background pixels of the character block. The method for binarizing an image further comprises separating the character block from the grouped block, and binarizing pixels of the separated character blocks into a first brightness value for character pixels and a second brightness value for background pixels by comparing the pixels of the separated character blocks with the threshold, and binarizing pixels of the background blocks into the second brightness value.

Please replace the paragraph of page 18, lines 7-12, with the following amended paragraph:

Finally, compared with the binarization device according to the first embodiment, the binarization device according to the fourth embodiment further includes the block growing part 160 and the block grouping part 170. A detailed description of the fourth embodiment of

the present invention will now be made. ~~made~~. In addition, it will be assumed that the image used herein is an image of a business card.

Please replace the paragraph of page 33, lines 22-29 to page 34, lines 1-2, with the following amended paragraph:

Through repetition of the steps 615 to 623, DCT conversion part 213 DCT-converts the respective blocks and the energy calculation part 215 performs the calculation of Equation (1) on all blocks (at $k = 0, 1, 2, \dots, 4799$). In step 625 (“Yes” 625 (“Yes” path from decision step 621), the block energy values S^k ($k = 0, 1, 2, \dots, 4799$) are applied to the threshold calculation part 217, and the threshold calculation part 217 sums the energy values S^k ($k = 0, 1, 2, \dots, 4799$), and calculates an average $\langle S^k \rangle$ by dividing the summed energy value by the total number TBN of blocks. The average value $\langle S^k \rangle$ is produced in accordance with Equation (2). The average value $\langle S^k \rangle$ becomes a threshold Cth used for determining the blocks as character blocks or background blocks.

Please replace the paragraph of page 38, lines 17-29 to page 39, lines 1-3, with the following amended paragraph:

After noise of the character block is reduced and the edges of the character block are enhanced using the quadratic filter or the improved quadratic filter in step 421, a binarization operation is performed in step 423 by comparing pixels of the character blocks with the threshold BTH or BTH_N. In the binarization process, if the pixel values are smaller than the threshold BTH or BTH_N, the corresponding pixels are converted into the brightness value β for background pixels, and if the pixel values are larger than the threshold BTH or BTH_N, the corresponding pixels are converted into the brightness value α for character pixels. Brightness values of character block pixels are compared with the threshold BTH, and

binarized into brightness value for character pixels or brightness value for background blocks. The binarized results are stored in step 425. If it is determined, however, in step 419, that the accessed block is a background block (“No” path from decision step 419, 419), the edge enhancement operation is not performed and the pixels of the background block are collectively binarized into the brightness value for background pixels in step 423.

Please replace the paragraph of page 40, lines 1-10, with the following amended paragraph:

Referring back now to FIG. 12, after ~~After~~ the binarization operation is performed, it is determined in step 427 whether the currently binarized block is the last block of the image. If the current block is not the last block (“No” path from decision step 427), the procedure ~~increase~~ increases the block number BN by one in step 429, and then returns to step 417 to repeat the above operation (step 417 through step 427, 427). Through repetition of the above operation, the character blocks and the background blocks of the image are binarized. In the meantime, if it is determined in step 427 that binarization on the last block of the image is completed, the binarized results of the image are provided to the binarization part 140 in step 431.

Please replace the paragraph of page 47, lines 28-29 to page 48, lines 1-2, with the following amended paragraph:

Through repetition of the above operation, the character blocks and the background blocks are binarized, and if it is determined in step 637 that the binarization is completed for all blocks ~~books~~ of the image, a binarized image of FIG. 21G is output in step 639.